

# **Designers Guide to Accessibility in Educational Occupancies**

**in accordance with  
NC State Building Code Volume I-C  
1999 Edition**

**August 24, 2000**

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**NC State Building Code Volume I-C**  
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**Purpose & Intent:**

The purpose of this guide is to acquaint designers and facility managers who are involved with K-12 school facilities in North Carolina with some of the principal accessibility issues for educational occupancies as they may be affected by the 1999 edition of the NC State Building Code, Volume I-C.

Every effort has been made, within necessary constraints of time and money, to identify issues that may be important to a successful project. However the guide is not intended as a comprehensive index or reference document to every detailed provision of the code that might be applicable to educational occupancies.

Understandably, a guide of this sort cannot cover every circumstance and does not carry the force of law, as does the building code itself. Therefore, although designers are entitled to use the guide for their own purposes in identifying issues that may be important to their designs, it is essential to verify with appropriate authorities the validity of applying any code-related information to specific projects.

The guide was prepared by A/E/C Support Services, Raleigh, NC, under a commission from the Engineering & Building Standards Department of Mecklenburg County, assisted by the Charlotte Section of AIA-NC. Appreciation is expressed to other architects and code officials who contributed comments and recommendations.

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## **General Issues:**

### **Code Applicability**

Applicability of Volume I-C to schools is found in two basic locations, Paragraph 1.2.5 which applies to "buildings, facilities or structures used for educational purposes through the 12th grade", and Paragraph 1.4.2.10, which applies to privately owned "places of accommodation" which include "A Place of Education."

It would appear that the Section 1.4 title is a misprint and the section is intended to apply the school-specific provisions of Volume I-C to all privately owned schools, possibly all the way through post-graduate level facilities -- not just in-home school facilities. This is unlikely to significantly affect the design of such facilities.

### **Children's Environments**

Volume I-C includes special provisions for accessibility (Chapter 32) as applicable to children 12 years old and younger. Generally speaking, these provisions apply only to facilities to be used specifically by children. For example, a staff toilet room intended for use principally by adults should be designed to adult accessibility standards, not children's standards. Additional variations from adult standards, other than those codified in Chapter 32, may be proposed to the local code enforcement jurisdiction, provided acceptable evidence is supplied about the desirability and suitability of the proposed alterations (Paragraph 32.1.3.1).

Where a facility may be used equally by children and adults, such as a ramped corridor leading from a learning center to a classroom area, both adult and children's standards must be applied.

Discussion with Laurel Wright of NC DOI, June 28, 2000: Where the actual use of facilities by younger children is indeterminate, as may be the case of common use toilets in a school serving grades 6 through 8, it is acceptable to design common use facilities to adult standards. Any specific facility explicitly intended for use by children 12 years old or younger shall be designed in accordance with children's standards. Where a child's use of a facility is always subject to supervision of an adult, the facility may be designed to adult standards.

There are some instances in which the differences between children's and adult facilities may not be intuitive. For example, the minimum width of an interior accessible route in a children's environment is 44 inches (Paragraph 32.2.2.1), as opposed to an adult environment, which is 36 inches (Paragraph 5.2.3).

Other specific issues about children's environments will be discussed as they may appear elsewhere in this guide.

### **Division of Buildings by Fire Walls:**

Under Volume I-C, Paragraph 1.3.3.2, all areas within a single school building structure, whether or not separated from other areas of the building by firewalls, must be treated as a single combined building for accessibility purposes. The existence of firewalls or other fire separations in a building does not create or imply separate building accessibility areas.

This is very different from the provisions of Volume I which permits using firewalls to divide a large building into smaller buildings in order to meet building construction type and egress requirements.

### **Alterations - General**

Under Volume I-C, the status of alterations to existing buildings is somewhat confusing. Basically alterations are governed by PART III: APPENDICES FOR ALTERATIONS.

Under current interpretations, the provisions of Part III do not mandate that alteration work has to be done (Paragraph 33.4.1), however, when alteration work is performed, it must meet the requirements of Part II or Part III as required (Paragraphs 33.1.3 and 33.4.2).

There are a variety of reasons why alteration work might be required to be performed:

- 1) Owner's Program. The owner has determined that certain areas of a school must be rearranged or modified to comply with the programmatic requirements of the school.
- 2) Non-compliance with Original Code: The existing construction has been determined not to comply with accessibility requirements in force at the time the original work was commenced.
- 3) Other Regulations: Modifications may be required by provisions of civil rights law such as the Americans with Disabilities Act, or by regulations of other agencies, such as the NC Department of Public Instruction.

An example might be a school in which an existing classroom is being enlarged, and provided with new doors and casework, but the toilet room in the classroom is only designated to be repainted, with new hardware being installed on the existing door. The toilet room meets the accessibility requirements of the code in force at the time it was constructed, but does not comply with current requirements for new construction.

The local code enforcement official is not obligated to determine the scope of required removal of barriers to accessibility. That obligation falls on the property owner, or in some cases the tenant, to be determined under applicable civil rights law (Paragraph 33.4.1). However, once barrier removal is initiated, the code enforcement official is required to enforce applicable requirements of the code (Paragraph 33.4.2).

In a school building, the classroom would be considered to be an "area of primary function" - in this case a teaching function. Area of primary function (Paragraph 34.2.2) is a term that varies in meaning depending on the programmatic use of the areas in question. By affecting an area of primary function, the alteration would require not only that the classroom be made internally accessible to the maximum extent feasible (Paragraph 34.1.1), but also that an accessible path of travel be provided connecting the classroom with other public areas, again to the maximum extent feasible.

Volume I-C Part III typically would not mandate that the toilet room in the classroom be altered. The toilet room would not be considered to be part of the area of primary function (teaching) unless it were used directly in the teaching process (Paragraph 34.2.2.1.2). The painting work and door hardware wouldn't activate the provisions of Part II or Part III, because they would be considered "minor alterations" and would not impose additional accessibility requirements (Paragraph 33.1.3, Example 2).

Nevertheless, if general alterations to the toilet room were to be performed, they would have to conform to the maximum extent feasible to the requirements of Part II - New Construction. If full compliance with Part II requirements were not feasible, then the provisions of Part III (in this case

Chapter 39) would be applied to define the minimum degree of accessibility required. (Paragraph 33.1.3)

As a rule, the test for infeasibility of one requirement does not provide a blanket exemption from all accessibility requirements. For instance, being unable to provide a 5 foot by 5 foot accessible toilet stall does not mean that lavatory counters do not have to comply with accessibility requirements. The infeasibility of providing access for wheelchairs does not mean that accessibility requirements for vision-impaired or hearing-impaired people are eliminated.

Alterations are not permitted to reduce the accessibility of existing facilities. It's also important to recognize that accessibility alterations may not reduce compliance with other code provisions.

For example, a 4-stall group toilet room cannot be made accessible by combining two of the watercloset stalls into a single larger stall if Volume II - Plumbing Code requires a minimum of four waterclosets in the toilet room. However, the alteration would be acceptable if only three watercloset stalls were required, as might be the case for a group toilet in a private school.

When making changes in an existing facility to improve accessibility. Always check to make sure that other provisions of the code are not violated by the change.

Once an alteration is undertaken, the applicability of Part II or Part III is determined by two tests:

1 - Technical Infeasibility: This is the principle test for determining whether compliance with Part II is feasible. It generally means that changes are not considered feasible when they would require alteration of load-bearing structural elements, or would be prohibited by physical or site constraints. An example of such a site constraint might be an existing building with a stepped up front entry door opening directly onto a downtown sidewalk right-of-way, preventing the installation of a ramp.

2 - Disproportionality: The term "technical infeasibility" does not incorporate considerations of the cost of altering a building for accessibility - that consideration comes under the term "disproportionality." This means basically that no more than 20 percent of the budget for alterations must be committed to accessibility improvements.

Under present policies, code enforcement officials are not authorized to make percentage disproportionality determinations for any project. Determination of the required scope of accessibility improvements must be made by the architect and owner on the basis of actual project scope and planned expenditures. Priority guidelines are provided in Paragraph 34.2.6.2. Responsibility for satisfying disproportionality scope requirements rest entirely with the owner and architect. The issuance of a NC building permit will not protect either the architect or the owner from any consequences of failing to meet these obligations.

### **Accessible Routes - General**

The definition of an accessible route (Paragraph 2.2.4) applies to both interior spaces and exterior spaces. In general, interior accessible routes are narrower (36 inches) than exterior routes (48 inches) except in schools serving children age 12 and under (44 inches).

Basically speaking, an accessible route must interconnect all accessible features on the entire school campus, from the accessible parking spaces to the sports and playground facilities, to the building entrances, to the classrooms and other functional spaces, to the food service facilities, and to the toilets and locker rooms. In the case of temporary structures, verify applicability with the local code enforcement jurisdiction.

Accessible routes may pass through parking lot aisles, sidewalks, ramps, hallways, rooms, elevators and wheel-chair lifts. They may not include steps, stairs, escalators or other abrupt level changes greater than 1/4 inch high (Paragraph 3.3.3 and elsewhere).

Just as accessible features must be distributed throughout a facility to allow disabled people essentially the same choices as other people, accessible routes must provide disabled people with essentially the same paths of travel provided for other people. For example, the principal entrances to a building must be made accessible (Paragraph 6.1.2) and therefore any paths of travel from accessible parking spaces to those primary entrances must also be made accessible. It is not sufficient to provide an accessible route to an alternative secondary entrance.

Where alterations are being performed on existing facilities, an accessible path of travel may be permitted instead of an accessible route. The principle difference between the two is that an accessible path of travel is subject to the disproportionate cost considerations of Paragraph 34.2.6. When in doubt, try to provide a fully accessible route between a parking lot or public transportation stop and the areas being altered. If the cost of providing this route would exceed 20 percent of your alteration budget, comply with the priorities of Paragraph 34.2.6.2.

### **Operating Mechanisms**

Chapter 16 includes requirements for access space, reach distance, mounting height, and force required to operate equipment and devices in accessible spaces and routes in the school facility. Although the examples given are light switches, dispensers and ATMs, Paragraph 1.2.1 makes it clear that these requirements apply to all "equipment, appliances, fixtures, and fittings in all buildings and facilities."

Architects and their engineering consultants must make sure that all controls except those "not intended for regular or frequent use by building occupants" (Section 16.3) be operable by disabled individuals. This means making sure that the operating controls on specified equipment comply with volume I-C as well as any other applicable regulations or standards, such as NFPA requirements.

It is not sufficient to follow any single standard - control mechanisms must be located to comply with the most stringent of all applicable standards. If there is a conflict with these requirements, dual devices may be required.

### **Security Barriers**

Where schools are provided with security barriers and metal detectors, an accessible route through the security barrier must be provided. Doors and gates must comply with provisions of Chapter 7, including appropriate minimum width (32 inches clear), approach zones, and operating hardware. Problems with these requirements are often seen in school libraries, which must also comply with the provisions of Chapter 25. Paragraph 25.4.1.1 includes a requirement for a 36 inch wide clear path through electronic book-checking devices.

### **Ramps**

Within accessible routes, whether interior or exterior, all walking surfaces exceeding a slope of 1:20 (5 percent) are considered to be ramps and must comply with the requirements of Chapter 5 for width, cross-slope, general arrangement, landing size and intervals, surfacing, edge protection and railings. Accessible ramps may not be steeper than a 1:12 slope.

Where ramps are being constructed as part of an alteration to an existing facility, and where compliance with the 1:12 maximum slope is technically infeasible, steeper slopes are permitted by Chapter 37. A slope of up to 1:10 is permitted for a maximum 6 inch rise (Paragraph 37.1.1.(1), and a slope of up to 1:8 is permitted for a maximum 3 inch rise (Paragraph 37.1.1.(2).

There are some differences between exterior ramps and interior ramps. For example, interior ramps may be as narrow as 36 inches clear between handrails, while exterior ramps must be at least 48 inches clear between handrails. Refer to Chapters 3, 4 and 5 for other differences.

Landing interval requirements now have two classifications: 1) a landing every 40 feet for ramps less than 1:16 slope, and 2) a landing every 30 feet for ramps exceeding 1:16 slope. Landings also have minimum size requirements. (Section 5.3)

Requirements for edge protections at ramps are now much more restrictive than before, and apply to drop-offs of 1/2 inch or more (previous requirement was 2 inches) and to adjacent sloped surfaces which exceed a slope of 1:12. These edges must be protected by curbs, bottom rails, or adjacent "flared" surfaces not exceeding a slope of 1:12. Refer to the illustrations on pages 88 and 89 for examples.

### **Railings**

With the exception of children's environments, railings for education occupancies are essentially the same as those for other occupancies. Railing requirements for ramps are generally included in Chapter 5. Railings for stairs are generally included in Chapter 7.

Chapter 32 (Children's Environments) requires that additional handrails be placed at a maximum height of 28 inches and not less than 9 inches below adult handrails in ramps and stairs used by children and adults alike.

The height range for adult handrails has changed from earlier codes and is now 34 inches to 38 inches. Pipe rail size can now be measured by inside pipe diameters, e.g. a pipe with an inside diameter of 1-1/2 inches is now acceptable as a handrail.

Be sure to check the required clearance between handrails. All clear dimensions are given to the outside surface of the railing. Other dimensions may be given to the centerline of the railing.

### **Protruding Objects**

Accessible routes are not allowed to have objects protruding uncontrolled into required spaces. A minimum clear head height of 6 feet 8 inches (80 inches) must be maintained. If any part of the overhead construction protrudes below 80 inches, a protective barrier not less than 27 inches high must be provided at the floor to guard the protrusion. (Section 10.2)

Wall mounted objects that have their lower edge more than 27 inches above the floor may protrude no more than 4 inches (Section 10.3). This would commonly apply to objects such as wall-mounted fire extinguishers, water coolers, and telephone cabinets. If any wall mounted objects protrude more than 4 inches beyond the wall, their lower edges must be within 27 inches of the floor.

Pedestal-mounted signs and other floor-supported objects which have their lower edges more than 27 inches above the floor may protrude no more than 12 inches beyond their supports (Section 10.4). Objects spanning between two supports located more than 12 inches apart must have their lower edges no higher than 27 inches above the floor. Under certain circumstances, required stair

handrail extensions could create an unacceptable protrusion. Review the illustrations on page 147 for acceptable handrail extensions.

Finally, protruding objects and protective barriers are not allowed to reduce the actual passage width to less than 32 inches for interior accessible routes, or 36 inches for exterior accessible routes (Section 10.5).

### **Public Telephones**

Where public telephones are provided as part of a school facility, at least one telephone per bank of telephones provided must comply with the requirements of Chapter 14, including installation height and provision for volume control. If interior public telephones are provided, at least one interior telephone must be equipped for TDD operation (Section 14.3). Review the provisions of Chapter 14 for detailed requirements. Note that there is a minimum length required for the receiver cord. This requirement is often overlooked by the telephone manufacturer and is typically a problem.



## **Site Development:**

### **Exterior Accessible Routes**

Each school facility must provide at least one exterior accessible route, which must coincide with the route provided for the general public (Section 3.1). The accessible route must connect accessible transportation facilities with accessible building entrances and exits and with other accessible site facilities and spaces used by students and staffers, such as parking lots and athletic or recreation facilities.

Exterior accessible routes must be a minimum of 48 inches wide, with provisions for wheelchairs to turn and pass. Walkway surfaces must be "fixed, firm and non-slip" (Paragraph 3.3.1). This does not necessarily mean concrete paving, but it does mean that surfaces such as crushed aggregate or asphalt must be installed and compacted in such a way that they will not soften or deform when exposed to heat, snow or rainfall.

For alteration work only, when site constraints make it technically infeasible to provide a 48 inch wide exterior accessible route, the width of the accessible route may be reduced to 36 inches. Likewise, passing spaces may be reduced from 60 inches by 60 inches to whatever maximum size may be available.

Where walkways are elevated or built-up of boards, they must conform to the requirements of Volume 1, Table 1604.1 for structural capacity, e.g. 100 pounds per square foot for pedestrian yards and terraces. Walking surface boards should be tongue-in-groove, or any gaps between boards must be minimized to the satisfaction of the code enforcement official to meet accessibility code requirements for continuous surfaces.

### **Curb Cuts and Curb Ramps**

Where accessible routes cross roadways, driveways and parking lots, differences in elevation must be accommodated by means of curb cuts, curb ramps or other inclined surfaces not exceeding a slope of 1:12. Curb cuts and curb ramps are generally subject to the same requirements as any other ramps, including requirements for width (minimum 48 inches), edge protections and handrails.

In some cases, ramp handrails are no longer required, as in the case of a ramp no longer than 72 inches with a rise of not more than 6 inches. This would apply to most curb cuts and curb ramps, provided the curbs are no higher than 6 inches.

Special requirements for curb cuts, curb ramps, corner curb cuts, and island cuts are found in Sections 4.7 through 4.10. Where existing space requirements of existing parking lots may make it technically infeasible to construct curb cuts or curb ramps in strict compliance with these provisions, Refer to section 36.4 for alternatives.

### **Passenger Loading Areas**

Where student drop-off and pick-up zones are part of a school's vehicular traffic pattern, then at least one zone must be provided meeting the requirements of Section 4.11, including arrangement and signage.

A canopy is not required for general public use, but if one is provided, it must also comply with the requirements of the section. Loading zones must be located on an accessible route connecting with the principal building entrances.

Where bus loading zones are provided for schools serving children 12 years of age or younger, at least one bus loading zone must be provided that is at least 12 feet wide by 50 feet long and meets the requirements of Paragraph 32.2.1. This paragraph requires a weather protective canopy or roof overhang which covers the entire loading zone. For loading zones which are not adjacent to the building, there must be a canopy extending from at least one building entry door to at least one accessible bus loading location.

### **Parking Lots**

Schools often have parking lots dedicated to specific uses, e.g. faculty parking, student parking, bus parking and public parking. Generally speaking, accessible parking spaces should probably be provided within each functional space, so that disabled individuals in each user group will have access equivalent to that of other users from the indicated parking areas.

Where a building has multiple accessible entrances, the accessible parking spaces adjacent to the building must be distributed to serve the appropriate entrances.

Accessible parking spaces are required to be located within 200 feet of the entrances being served, with an accessible route connecting the accessible spaces with the entrances being served. Where parking lots are provided at greater distances, the required accessible spaces may be redistributed into parking lots adjacent to the buildings, subject to acceptance by the code enforcement official. A plan of the entire campus, showing all the parking lots and entrances served, must be submitted for approval.

The numbers of required accessible parking spaces will vary with the number of overall spaces provided, however the old count of 2 percent no longer applies. Refer to Paragraph 4.2.1 for a table outlining the present requirements.

At least one in every eight accessible parking spaces must be a van accessible space. Be aware that there is a 9 foot (108 inch) minimum overhead clearance requirement for van accessible spaces. (Paragraph 4.4.5) On hard-surfaced lots, parking spaces and access aisles must be clearly marked, either by paint striping or differences in surface materials, colors or textures. (Paragraph 4.2.3)

Where existing parking lots are being altered, Chapter 36 includes specific requirements for alterations to provide accessible parking spaces. Where no accessible parking spaces exist, new spaces must be provided complying with Chapter 4. Special provisions are included for parking lots originally built between 9/1/73 and 9/11/89 (Paragraph 36.2.2) and those originally built between 9/12/89 and 7/1/99 (Paragraph 36.2.3).

Where converting existing parking spaces to accessible parking spaces would conflict with minimum parking requirements of applicable zoning and land use ordinances, refer to Section 36.3 and the illustration on page 527.

Where accessible parking spaces are arranged so that persons using them must cross one or more vehicular ways, the cross-walk aisles must also be marked. The illustration at the bottom of page 42 is incorrect, as it shows the markings stopping at the vehicular way. Instead, the crossing markings must extend across the vehicle way. If your copy of Volume I-C does not include supplementary page 42.1, you should obtain a copy from your local code enforcement official.

### **Playgrounds**

Volume I-C does not have specific requirements for accessible playground facilities, however general site access requirements will apply (Chapter 3). A variety of manufacturers provide playground surfaces and equipment specifically designed for use by disabled children.

### **Playing Fields and Exterior Athletic Facilities**

There are no specific requirements for playing fields themselves other than general site access requirements in Chapter 3, which establish requirements for exterior accessible routes. However, all facilities associated with the fields -- including concession stands and ticket booths (Chapter 26), toilets (Chapter 11), shower rooms (Chapter 12), locker and dressing rooms (Chapter 27) -- must be on an accessible route and designed for accessibility according to applicable requirements for each facility type.

Grandstand and bleacher requirements are governed under the provisions of Chapter 22 - Assembly Seating. All accessible seating must be connected by an accessible route to all related areas, e.g. the playing field itself, any team sidelines areas, dressing areas, and locker rooms.

Where seating is provided for 300 or fewer persons, wheelchair seating spaces may be clustered into one location within or adjacent to the seating area. If more than 300 people are being accommodated, wheelchair seating must be distributed throughout the seating area and provide a variety of seating choices.

Entry gates must comply with the requirements for doors located on accessible routes (Paragraph 7.2.3). Where turnstiles or revolving gates are provided, an accessible gate must also be provided within 20 feet (Paragraph 7.2.4). Don't forget that under-foot gratings associated with accessible routes must comply with Paragraph 3.3.6.

There is an open question whether facilities such as elevated pressboxes and camera platforms are always required to be accessible. Paragraph 15.2.1.1 appears to exempt similar facilities when they are "not open to the general public," and are smaller than 500 square feet in gross area, among other requirements. When in doubt, consult with your local code enforcement jurisdiction for an interpretation.

### **Service Yards and Loading Docks**

Service yards, loading docks, and similar service facilities are generally exempt from classification as "entrances" (Paragraph 6.1.1) and are not required to be accessible unless they are the only entrance to a facility for both public and employee use, such as the service door into a maintenance building (Paragraph 6.2.1.5), or unless they are part of a required means of egress (Paragraph 6.3.1).

## **Building Features:**

### **Means of Egress and Areas of Rescue Assistance**

On the level of exit discharge, all exits and other means of egress must be accessible (Paragraph 6.3.1), even when the exit door leaf itself may be permitted to be secured by other egress provisions of Volume I.

Making an exit accessible means connecting it from the exit discharge to a public way with an accessible route. It is no longer sufficient to simply build a 5 foot by 5 foot square concrete pad surround by dirt and grass outside of an exit discharge.

Where an exit cannot be made accessible, then areas of rescue assistance must be provided, except in school buildings with supervised sprinkler systems, and in exterior facilities such as open parking garages (Paragraph 6.3.3.1). The most common example of an inaccessible exit is an exit door opening from an upper floor into a fire exit stair.

Exit stairs are considered to be accessible only on the level of discharge, where a disabled person exiting the building can escape unassisted without having to use the stairs themselves. All other required exits leading into exit stairs (those above and below the level of discharge) are therefore inaccessible by definition and must be provided with areas of rescue assistance (Paragraph 6.3.2.1.1). This condition is illustrated on page 104.

Areas of rescue assistance generally require one or two floor spaces, minimum size 30 inches by 48 inches, located in a fire-protected "smoke-proof" environment. (Paragraph 6.3.2.2) This could be a vestibule leading to a stair, a landing inside a stair enclosure, or similar space that connects with but doesn't project into the required width of the means of egress. Under certain circumstances, a pressurized elevator lobby may be used as an area of rescue assistance (Paragraph 6.3.2.2.1 (7)).

Two wheelchair spaces are required unless an exit provides emergency egress calculated at less than 200 or more people.

Clarification: An interpretation by NC DOI indicates that the term "smoke-proof enclosure" as used in Volume I-C generally means only that enclosures must be smoke-tight and doors opening into areas of refuge must be gasketed against the passage of smoke. Compliance with Volume 1, Section 1005.5 is not required.

Exit stairs serving areas of rescue assistance have special width requirements. Minimum clear width between handrails (measured from surface to surface of the handrails) is 48 inches (Paragraph 6.3.2.4.1).

Areas of rescue assistance must be provided with appropriate signage (Paragraph 6.3.2.6.1) and two-way communications (Paragraph 6.3.2.5). Although the code is not explicit, NC DOI has expressed preference for communications devices specifically designed to serve Areas of Rescue Assistance.

### **Building Signage**

Provisions for building signage (Chapter 18) are much more complicated than ever before. Requirements of Chapter 18 include locations, heights, sign sizes and shapes, character size and proportion, surface textures, contrast, symbols and even the messages to be placed on certain signs. The chapter is short but its implications are long.

A brief overview of the sorts of things architects need to consider in designing signage for schools include the following requirements from Chapter 18:

A typical wall-mounted sign meeting accessibility requirements has raised letters, numerals, characters, and symbols on a matte or non-glare background of a contrasting color. Alphanumeric messages must be repeated on the sign in Grade 2 Braille. Raised letters must be uppercase only with sharply defined edges. Characters must meet prescribed width-to-height ratios and stroke-width-to-height ratios. The horizontal centerline of the sign must be located at 60 inches above the floor.

There is a difference between optional and mandatory signage. The following signs are optional, but when provided, must comply with accessibility requirements:

Exterior and interior signs which generally designate permanent rooms and spaces.  
(Paragraph 18.1.1)

Exterior and interior signs which generally provide direction to or information about functional spaces of a building. (Paragraph 18.1.3)

The following signs are mandatory:

Signs which identify safety devices intended for public use. (Paragraph 18.1.1) This means wall-mounted accessible identification signs must be provided for fire-alarm pull-stations, fire extinguishers, and other safety devices. This has been interpreted to require wall-mounted signs that identify overhead illuminated exit signs.

Signs indicating accessible facilities such as passenger loading zones, entrances, toilet/bathing facilities, TDD telephones and assistive listening systems, accessible seating, etc. Some signs may be omitted when all facilities of a particular type provided are accessible, such as entrances or toilet/bath facilities (Paragraph 18.1.3). In the case of building entrances, inaccessible entrances must have signs directing people to the nearest accessible entrance.

Signs which identify hazardous areas such as loading docks, boiler rooms, electrical rooms, etc. (Paragraph 18.5)

A few sign types are exempted from accessibility requirements, including building directories, menu boards, and temporary/changeable room or space information such as identification of room occupants.

Signs that are suspended overhead or projected from the wall in an overhead location must also meet character height requirements -- sized proportionately for viewing distance with a minimum height of 3 inches for an uppercase "X" for reasonably near viewing -- but characters do not have to be raised and may include lowercase characters.

Messages on toilet signs are restricted to indicated standards, e.g. "MEN, MEN'S TOILET, WOMEN" or "WOMEN'S TOILET" only, and must include male or female pictograms approximately 6 inches high minimum. For schools serving children 12 years old or younger, messages designating student toilets may use equivalent "BOY" or "GIRL" messages (Chapter 32). Pictograms alone are insufficient. If pictograms are provided, the appropriate verbal message must be provided immediately below the pictogram.

Chapter 18 is not the only source of signage requirements in to be found in Volume I-C. Other provisions which may affect building signage in schools can be found in Chapter 4 (Parking Spaces and Passenger Loading Zones), Chapter 6 (Entrances, Areas of Rescue Assistance and Means of Egress), Chapter 10 (Protruding Objects), Chapter 11 (Toilet Rooms), Chapter 14 (Telephones), Chapter 22 (Assembly Seating), Chapter 32 (Children's Environments), Chapter 38 (Entrances and Means of Egress - Alterations), Chapter 39 (Toilet Rooms and Bathing Facilities - Alterations), Chapter 42 (Assembly Seating - Alterations), and Chapter 46 (Dressing Rooms - Alterations). Refer to Appendix A for additional information about signage related to mechanical and electrical services.

### **Visual Alarms**

Chapter 17 includes requirements for alarm devices, many of which have the same sorts of access, reach and location requirements indicated for controls, as well as technical criteria (Sections 17.2 and 17.3). Refer to Appendix A for additional information.

Make sure electrical engineering consultants know that when fire alarm systems are provided, visual alarm appliances are required in "common use" areas (Paragraph 17.1.2), including toilets, shower rooms, dressing rooms, lobbies, corridors, stairs, teacher's lounges, meeting rooms, classrooms, cafeterias, file rooms, and "similar spaces that are not used solely as employee work areas." NC DOI takes the position that there are almost no areas in schools that are not common use areas. Refer to Appendix A for additional information.

### **Passenger Elevators**

A passenger elevator (or ramps complying with Chapter 5, per Paragraph 15.1.7) is required in all publicly owned schools two stories or more in height (Paragraph 15.2.2). Privately owned schools three stories or more in height with any floor exceeding 3,000 square feet must have an elevator (Paragraph 15.2.8 Note 1). Two-story privately owned schools are not required to have an elevator (Paragraph 15.2.8 Note 2).

Unlike ramps, platform lifts are not generally acceptable as substitutes for elevators. Paragraph 15.11.1.1 includes a brief list of circumstances in which a platform lift may be provided instead of an elevator.

Where more than one elevator is provided, all elevators must be accessible. In the case of existing elevators, this requirement is subject to the provisions for technical infeasibility, disproportionality, size and arrangement as applied in Chapter 41. If significant structural changes are being made to install a stair or escalator, then similar changes must be made to provide an accessible elevator (Paragraph 41.1.1).

There don't appear to be any adult elevator requirements specific to schools. General requirements are provided in Sections 15.3 through 15.10. The requirements for children's environments may affect elevators (Paragraph 32.2.14) that are subject to use by children without adult supervision.

Even where elevators are not required, Paragraph 15.2.10 requires that all floors above and below the accessible level be fully accessible on each level, even though there may be no requirement for an accessible route connecting the floors. When toilet and bathing facilities are provided on any floor level not served by an elevator, accessible facilities must also be provided on the accessible floor.

Additionally, when elevators are not provided, all stairs must have a minimum tread width of 11 inches (Paragraph 8.2.1).

Where elevators are provided, they must be located on accessible routes (Paragraph 2.2.4) connecting with other accessible building features. Floor surfaces in elevator cabs must meet accessibility requirements (Paragraph 9.1.1).

Elevator pits and overhead hoist rooms that are commonly reached by ladders, catwalks, crawl spaces and similar approaches do not have to be accessible (Paragraph 1.2.11.2 (2)). Walk-in equipment spaces such as hydraulic elevator machine rooms should be treated like employee work areas.

Freight elevators are not required to be accessible unless they are proposed to serve as required elevators, in which case they must also meet the requirements for passenger elevators (Paragraph 15.1.4).

### **Sliding Doors**

A question was recently posed to NC DOI as to whether sliding doors are permitted as part of an accessible route in a small private school facility. The answer was given that sliding doors are acceptable as accessible doors provided they are not part of a required means of egress or otherwise required to be swinging doors by other code provisions.

Accessible sliding doors must meet all applicable requirements of Chapter 7, including provisions for single-effort operation (Paragraph 7.1.2), clear opening (Paragraph 7.2.1), clear floor space (Section 7.3), activating pressure (Section 7.6), door thresholds (Section 7.8), and Door Hardware (Section 7.9). Clear floor spaces at sliding doors are illustrated on pages 130 and 131. Thresholds at sliding doors can be as high as 3/4 inches instead of 1/2 inches.

### **Closet Doors**

Where shallow reach-in type closets are provided, accessible clear door openings may be as narrow as 20 inches, provided the reach-in range does not exceed 21 inches. If your copy of Volume I-C does not have a clarification note dated 6/8/99 in the upper right corner of page 123, then disregard the closet rod shown in the shallow closet illustration. Refer instead to the "side-reach" illustrations shown on page 311, and note that accessible closets with clothes hanger rods may be deeper than those with storage shelving.

## **Building Functions:**

### **Common Use Areas**

General: In some school facilities, virtually the entire building is going to fall within the definition of "common use," except for areas that are never accessible to students such as mechanical and electrical equipment rooms, food storage and preparation areas, and teacher's lounges. Any space that is available to the public, or might be used by a student on instruction of the faculty and staff, should be treated as a common use area.

Building Entrances: Dealing with requirements for accessible entrances can be complicated and confusing.

For the purposes of accessibility, a "public entrance" is any entrance that is not a service, delivery or loading entrance (Paragraph 6.1.1). At least 50 percent of all public entrances to a school must be accessible (Paragraph 6.2.1.1), and the number of accessible entrances must be equal to or greater than the number of required exits (Paragraph 6.2.1.2). Where there are fewer entrances than there are required exits, all entrances must be made accessible. At least one accessible entrance must be located on the ground floor.

For existing buildings, if alterations are made to building entrances, at least one entrance must be made accessible (Section 38.1). If the building already has an accessible entrance, alterations may be made to other entrances without making them accessible, provided that the accessible entrance is on an accessible path of travel connecting with the area of primary function being altered.

Confused? Don't feel strange. Provisions for entrances associated with alterations can be very complicated, depending on the scope of work involved in the alteration work.

Corridors: The width and length of corridors may affect the intensity and number of visual alarm appliances required (Paragraph 17.3.3.3). Refer to Appendix A of this guide for additional information.

Corridors are also the location where most drinking fountains, water coolers and fire extinguishers are likely to be installed. Where any of these or similar wall-mounted items are located in corridors or other accessible routes, they must comply with the requirements for protruding objects (Chapter 10).

Fire extinguishers, wall-cases and wall-mounted telephones are commonly installed in violation of the protruding objects requirements. Make sure that some portion of any wall-mounted object extends down to within 27 inches of the finished floor, or provide railings or other appropriate guards within 27 inches of the floor..

Drinking fountains and water coolers have their own requirements, located in Chapter 13. However, remember that these devices must also be arranged or guarded so that they do not violate the requirements for protruding objects (Paragraph 10.3.1), including the minimum clear width of an accessible route (Paragraph 10.5)!

The dimension of exactly 27 inches clear beneath a cantilevered drinking fountain or water cooler permits an installation which complies both with Paragraph 13.2.3 and Paragraph 10.3.2, and allows the device to protrude more than 4 inches off the wall.



If a corridor includes or opens into an area which includes a stair serving a floor above, make sure the underside of the stair is properly guarded as an overhead protruding object (Paragraph 10.2.2). Refer to the drawing on page 154.

**Enclosed Courtyards:** Enclosed courtyard facilities should generally comply with applicable site access requirements. Doors connecting with the courtyard should comply with requirements for accessible routes into common areas. Refer to Appendix A for mechanical/electrical requirements.

**Toilet Rooms:** Accessibility for toilet rooms is regulated by the provisions of Chapter 11, a somewhat long and complicated chapter. Paragraph 11.1.1 basically requires that all public or common toilets be accessible. Accessible toilets in school buildings must be arranged so that no one in the building has to travel more than 200 feet to reach an accessible toilet (Paragraph 11.2.1). Accessible stalls must have doors of the size and type indicated. Paragraph 11.8.1.2 permits the use of individual toilet rooms for modular classrooms.

A common design error is the omission of separate toilet facilities for staff and students, both of which must be accessible. Separate male and female facilities must be provided for staff toilets, not unisex facilities.

Generally, individual unisex toilet rooms are not acceptable in schools except in classrooms and in some alterations. Section 11.8 includes requirements for the design and arrangement of acceptable individual toilet rooms, including minimum requirements for unisex toilet rooms in classrooms.

One provision that may be unfamiliar is the requirement for a second accessible toilet stall to be provided whenever there are 6 or more stalls in any particular toilet room. This additional stall can be as narrow as 36 inches wide; with length, hardware and clearances as defined in Paragraph 11.4.3.

Operating controls such as faucet handles and flush controls must be usable by persons with poor grasping ability. One helpful rule of thumb is that if an able person can operate the control easily with a closed fist, then the control is probably usable by a disabled person. Flush controls must be located on the "wide" (wheelchair approach) side of waterclosets (Paragraph 11.6.1 (4), except where water closets are permitted to be centered in secondary accessible compartments (Paragraph 11.4.3).

Toilet rooms serving unsupervised children 12 years of age and younger must comply with provisions of Chapter 32, Paragraphs 32.2.4 through 32.2.9, which provide for differences in toilet stall size, grab-bar height and arrangement, toilet fixture location within a toilet stall, lavatory height and arrangement, urinal height and arrangement, and toilet accessory heights and arrangements. Where toilet rooms also serve older children or are used by younger children only under adult supervision, the requirements for adult toilet rooms may be used, subject to concurrence by the local code enforcement jurisdiction.

Paragraph 32.2.4.2 requires a minimum clear height of 12 inches below toilet compartment enclosure panels at the front and at least one side of all Type I and II stalls for children.

Where schools provide pre-kindergarten or day care facilities, there may be other specific toilet requirements for these facilities. Be sure to check with the code enforcement official local to the project to identify any special requirements.

### **Administrative and Faculty Areas**

**Student Service Areas:** In general, all areas that may be used by students or are used by staff to provide services to students must be accessible, including office reception areas, supply and storage rooms, and staff offices.

Sales or check-out facilities provided for spaces such as book rooms, supply rooms, libraries, box offices and concession stands must comply with the accessibility requirements of Chapter 26. These requirements can affect counter heights and arrangements, security glazing, pass-through grilles and windows, voice communications devices and signage.

**Employee Work Areas:** There are provisions in Chapter 1 (and in the ADA) that exempt areas identified as "employee work areas" from full accessibility (Paragraph 1.2.12). These areas are instead covered by the employment provisions of the ADA which require that employers may not discriminate against disabled employees. Accessible facilities would have to be provided at the time a disabled person were employed.

It is arguable that in a school environment, especially in the older grades, most employee work areas may be used at some time by parents or students and thus would fall into the category of common use areas. This is the approach most likely to be taken by NC DOI staff. Therefore, it's probably a good idea for designers not to use the "employee work area" exemption, except in areas that are entirely inappropriate for any sort of public use, such as custodial or mechanical/electrical service rooms..

### **Instructional Areas**

**General Classroom and Laboratories:** There are no specific accessibility requirements referenced for classrooms, laboratories and other curriculum/teaching areas. Such areas are considered to be common use areas and must therefore be accessible.

Applicable requirements must be derived from accessibility standards for the components of the room, such as doors and hardware (Chapter 7), accessible routes (Chapter 2), surfaces (Chapter 9), height and reach (Chapter 16 and elsewhere) and signage (Chapter 18). Teacher offices and work areas associated with specific classrooms generally must also be accessible.

Cabinets and shelving used for storage must comply with the approach and reach requirements of Chapter 20. This chapter also governs cabinet hardware.

Fixed or built-in tables and seating must comply with Chapter 21. This chapter also applies to classroom and laboratory workstations. A minimum of 5 percent of student workstations must be accessible.

When multiple staff facilities of identical or similar function are provided, such as private teacher work rooms that are not normally available to students, the local code enforcement jurisdiction may not require that all such facilities be accessible, provided there are a sufficient number of accessible units distributed throughout the school facility.

**Special Use Classrooms:** As in general classrooms, any equipment, cabinets, or other specialty components provided in special use classrooms such as teaching kitchens should comply with accessibility requirements for the components of the room. In a teaching kitchen, at least one set of cabinets and appliances should be set up to comply with the requirements of Paragraph 30.5.4 - Kitchens.

For example, floor risers provided in a band room should comply with the assembly seating requirements of Chapter 22. If the capacity of the riser area is less than 300 people, wheelchair seating positions may be concentrated and would not have to be distributed throughout the risers. The minimum number of wheelchair seating locations is given in Paragraph 22.1.1. Consult with the local code enforcement jurisdiction about the applicability of requirements for signage.

An electric-fired kiln provided in an art room should be located so that it meets the approach and reach requirements of Chapter 16 in a way that's appropriate to the use of the kiln. For example, if both hands are generally required to load and operate the kiln, the designer should provide for a forward approach, not a side approach to the kiln.

**Children's Classrooms:** Where classrooms serve children 12 years old or younger, the requirements of Chapter 32 may apply, including Paragraph 32.2.2 - Interior Accessible Route (44 inches clear width), Paragraph 32.2.7 - Lavatories and Sinks, Paragraph 32.2.12 - Drinking Fountains and Watercoolers, Paragraph 32.2.15 - Controls and Operating Mechanisms, Paragraph 32.2.17 - Storage and Paragraph 32.2.18 - Seating and Tables. Application of children's requirements does not eliminate the requirement to accommodate adults occupying the same classroom.

### **Libraries/Media Centers**

Like classrooms and laboratories, most applicable requirements must be derived from accessibility standards for the components of a library, such as doors and hardware (Chapter 7), accessible routes (Chapter 2), surfaces (Chapter 9), height and reach (Chapter 16 and elsewhere), cabinets and shelving (Chapter 20), study carrels and tables (Chapter 21), and signage (Chapter 18).

Unlike classrooms and laboratories, there are some specific requirements for library facilities in Chapter 25.

Section 25.2 requires that book stacks must be laid out with a minimum 36 inches clear aisle width between stacks. There is no limitation on the height of stacks shelving.

Section 25.3 sets requirements for card catalogs and magazine displays. Again, a 36 inch clear aisle width is required. The bases of card catalogues must be at least 18 inches above the finish floor. The height may be 48 inches or 54 inches based on whether a forward approach or side approach is provided. Similar requirements are established for magazine racks.

Where electronic catalog devices are provided, at least one must be on a table or cabinet meeting the requirements of Paragraph 21.2.1 and Section 21.3, and identified with an international symbol of accessibility.

Check-out areas must comply with the commercial standards described in 26.2.1. If separate check out and return counters are provided, both must be accessible.

Security devices must comply with Section 25.5 - Traffic Control. Gates must provide a 32 inch clear path. Open book security devices must provide a 36 inch clear aisle width. Where turnstiles are provided, an adjacent means of egress complying with Paragraph 7.2.4 must also be provided.

Children's environment requirements also apply to library card catalogs. Refer to Paragraph 32.2.20.

### **Auditoriums, Ticket Booths and Concession Stands**

Requirements for school auditoriums are essentially identical with those for any general use auditorium and are governed principally by Chapter 22 - Assembly Seating

Among other things, this chapter defines the number of seating spaces required to be wheelchair accessible, as tabulated in Paragraph 22.1.1. The requirements range from about 4 percent for a seating capacity of 50 people, to a little over 1 percent for seating 500 people or more. Companion seats must be provided adjacent to wheelchair seating spaces.

Acceptable locations for wheelchair accessible seating are described in Paragraph 22.2. When more than 300 seats are provided, accessible seating must be distributed to offer lines of sight that are comparable to abled people in the audience. Effectively all sightlines must be comparable, which means a person in a wheel chair must be able to see through and around spectators who are standing. Refer to diagrams on page 323 for an explanation.

Accessibility symbol signs must be provided at accessible wheelchair areas and accessible seats (Paragraph 22.1.2.1). In areas subject to darkening, the signs must be reflective.

In addition to wheelchair seating spaces, an additional 1 percent of the total number of seats must be located on an aisle and provided with a removable or fold-down armrest for the convenience of people on crutches or using walkers.

Paragraph 22.1.4 requires that accessible routes be provided from accessible audience seating areas to performing areas, including stages, stage platforms, dressing and locker rooms, orchestra pits, and similar performance facilities.

Section 22.4 regulates Assistive Listening Systems (ALS), including types and locations. Permanently installed systems are basically required for all assembly areas, except for areas with no fixed seating, no sound amplification system, and accommodating fewer than 50 people (Paragraph 22.4.1.1). These exempted areas must nevertheless be wired for using a portable ALS (Paragraph 22.4.1.2). Hearing loss accessibility symbol signs must be provided at ALS locations and ticket offices (Paragraph 22.4.3.1.).

Concession Stands and Ticket Booths: Since these facilities are normally staffed by students or public volunteers, both sides of the service counter should be accessible. In addition to typical requirements already discussed -- including doors, accessible routes, maneuvering space, reach and approach requirements, operating controls, counter heights and similar issues -- concession stands must also comply with the requirements of Chapter 26 - Business and Mercantile.

The principal effect of this chapter will be on service and check-out counters. The illustrations on pages 382, 382, and 386 cover most of the situations that should normally be encountered.

### **Physical Education Facilities**

Gymnasiums must also comply with Chapter 22 requirements for accessible seating, including all the issues identified in this guide for auditoriums. Bleachers installed in gymnasiums must comply with the requirements of Volume I - General Construction Paragraph 403.6, and have appropriate protective railings as required by Volume I Paragraph 1019.11.11 and Paragraph 1019.11.12.

Where accessible viewing areas are required in bleachers and viewing sightline slopes exceed 5 percent, the viewing positions may be "clustered" instead of completely distributed. Refer to illustrations on pages 322 and 324 for clarification.

**Shower Rooms:** Most of the provisions for shower rooms (Chapter 12) parallel Chapter 11 requirements for toilet rooms, although there are some subtleties.

Like private toilet rooms, private shower rooms must be made adaptable for accessibility, (Paragraph 12.1.2). This requirement applies to facilities provided for the school's coaching staff. If a toilet or shower is provided for a coach, it must be constructed to be accessible or adaptable for later alteration. Paragraph 12.1.5 requires a non-slip finished floor in shower enclosures.

Where prefabricated accessible shower enclosures are proposed, they must be certified in writing to comply either with NCSBC Volume I-C, ADAAG, or ANSI A 117.1 - 92.

Individual privacy-type shower stalls are not required the code. However, if such showers are provided for public or common use, at least one unit in each shower room must be accessible and provide features and conveniences equivalent to those in the standard showers. For example, if dressing compartments and seats are provided with standard showers, a dressing compartment and bench complying with Chapter 27 must be provided with the accessible shower.

**Locker/Dressing Rooms:** A requirement for accessible lockers is not specifically addressed by the code, however, since the definition of accessible building elements (Paragraph 2.2.21) includes building features such as seating and water fountains, the local code enforcement jurisdiction may extend this requirement to include accessible lockers.

If accessible lockers are required, locker units should be specified to include accessible latches and to comply with reach and approach requirements indicated in Chapter 20. In the case of some full-height 72 inch tall lockers on 6 inch high bases, this may require adjusting the manufacturer's standard height of shelves and coat hooks to meet reach range limits illustrated on pages 310 and 311.

Otherwise, locker/dressing room facilities are governed by Chapter 27 - Dressing/Fitting Rooms. If benches are provided in locker rooms, at least one accessible bench must be provided that complies with Paragraph 27.1.3. If mirrors are provided, then at least one mirror must comply with the requirements of Paragraph 27.1.4.

If more than one dressing room is provided in the building, then all accessible dressing rooms must be identified with the international symbol of accessibility.

### **Dining Facilities**

Dining facilities generally must comply with the requirements of Chapter 23 - Restaurants and Cafeterias. The requirements of apply principally to dining, vending and food serving areas.

Food preparation areas would be considered to be employee work areas and must only comply with the minimal requirements of Paragraph 1.2.12. However, in the event a food preparation employee becomes disabled or a disabled employee is hired, the work areas utilized for that employee must then be made accessible. This would also apply to food storage facilities, including dry storage rooms and walk-in coolers and refrigerators.

Equipment used in food service areas must comply with requirements of Section 23.4, including height of tray slides (34 inch maximum above finished floor) and aisle width (36 inches clear from

edge of tray slide to surface of guardrail or other enclosing construction. Self service shelving is also governed (Paragraph 23.4.3), depending on the type of approach (forward or side approach) that is provided.

Dish return and dish washing areas are not specifically governed, however, the counter height at any pass-through openings from the public or common use side should comply with typical approach and reach requirements found in Chapter 23 and in Paragraph 16.2. Facilities used only by staff would be subject to employee work area requirements.

### **Temporary Classrooms and Other Temporary Facilities**

Section 1.2.10 requires that most temporary structures and facilities be accessible. Designers should consult with the local code enforcement official for clarification about how this requirement may affect an individual project. Generally, structures and facilities that are "directly associated with the actual process of construction" (Paragraph 1.2.11.1) are exempt from accessibility requirements unless they serve a public purpose, such as a pedestrian walkway cover.

## **END OF GUIDE**

### ***The Fine Print:***

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